

Application No. 10/643,262
Docket No. 13DV-13041-15
Amendment dated February 28, 2005
Reply to Office Action of November 30, 2004

REMARKS

In the Office Action, the Examiner reviewed claims 1 and 40-52 of the above-identified US Patent Application, with the result that all of the claims were rejected under 35 USC §102 and/or §103. In response, Applicants have amended the claims as set forth above. More particularly:

Independent claim 1 has been amended to incorporate the limitations of its dependent claim 42, namely, the hood (52) defining the coating region within the coating chamber (12), and a second aperture (62) in a wall of the hood (52) through which the electron beam (28) enters the coating region.

Independent claims 1 and 47 have been amended to clarify that the electron beam (28) passes through the first aperture (68) and the second chamber (64) before passing through the coating chamber (12), passing through the second aperture (62), and then entering the coating region, as evident from Figure 6.¹

Claims 1 and 47 have also been amended to require means (54,58) for introducing gases into the coating region within the hood (52). Support for this amendment can be found in Applicants' specification at page 13, lines 15-

¹ According to MPEP §2163 II.A.3(a), "drawings alone may provide a 'written description' of an invention as required by [35 USC §112, first paragraph]," and "[i]n those instances where a visual representation can flesh out words, drawings may be used in the same manner and with the same limitations as the specification." (Citations omitted).

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20, page 15, lines 6-12, and Figure 6.

Claims 1 and 47 have been further amended to specify that the second aperture (62) in the hood (52) is sized so that the introducing means (54,58) maintains the coating region at a second subatmospheric pressure greater than a first subatmospheric pressure within the coating chamber (12). Support for this amendment can be found in Applicants' specification at page 14, lines 21-32, and page 15, lines 6-12.

Independent claim 1 has been amended to cancel the limitation for the pressure-maintaining means (34).

Dependent claims 40, 41, and 43 have been amended to recite the "wall portion" as a first or second wall portion.

In view of its limitations being incorporated into claim 1, claim 42 has been amended to recite a limitation that finds support in Applicants' specification at page 14, lines 27-32.

In view of the amendments to its parent claims 1 and 42, dependent claim 45 has been amended to depend from claim 1.

Dependent claims 45, 49, and 51 have been amended to recite that the second chamber (64) has a wall portion facing, separated from, and/or unattached to the hood (52) as shown in Figure 6, so as not to be limited to being parallel to the wall of the hood (52).

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Dependent claims 44 and 46 have been amended to limit the second chamber (64) to a single aperture, as shown in Figure 6.

Applicants believe that the above amendments do not present new matter. Favorable reconsideration and allowance of claims 1 and 40-52 are respectfully requested in view of the above amendments and the following remarks.

Rejection under 35 USC §102 and/or §103 based on Sekiguchi

Independent claim 1 and its dependent claims 40-42 were rejected under 35 USC §102(b) as being anticipated by Japanese Patent Publication JP07258832A to Sekiguchi, or in the alternative, under 35 USC §103 as being unpatentable over Sekiguchi. Applicants respectfully request reconsideration of this rejection in view of the following comments.

As noted in §2131 of the MPEP:

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. The identical invention must be shown in as complete detail as is contained in the ...claim. The elements must be arranged as required by the claim, but this is not an ipsissimis verbis test, i.e. identity of terminology is not required. (Citations omitted).

Applicants' amended independent claim 1 recites an EBPVD coating apparatus

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(10) comprising a coating chamber (12), a hood (52) that defines a coating region within the coating chamber (12), means (54,58) for introducing gases into the coating region within the hood (52), an electron beam gun (30) for projecting an electron beam (32) into the coating region, a first aperture (68) in a wall of the coating chamber (12) through which the electron beam (28) passes before entering the coating chamber (12), a second aperture (62) in a wall of the hood (52) through which the electron beam (28) passes before entering the coating region, and a second chamber (64) within the coating chamber and enclosing the first aperture (68) so as to separate the first aperture (68) from the coating chamber (12) and the coating region. The second aperture (62) is required to be sized so that the introducing means (54,58) maintains the coating region at a subatmospheric pressure greater than that within the coating chamber (12).

Sekiguchi was cited as disclosing an EBPVD apparatus with a coating chamber 2, a shielding body 33 that encloses an outlet hole 27 for an electron beam, and multiple holes 33b in the shielding body 33 through which the electron beam passes before exiting the shielding body 33 and impinging a material 10 to be deposited. While Sekiguchi is said to be read as disclosing a separate enclosure 9 that contains the material 10, Sekiguchi does not disclose that the enclosure 9 is provided with an aperture through which the electron

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beam enters the enclosure 9, or that such an aperture is sized to maintain an elevated pressure within the enclosure 9 relative to the region of the coating chamber 2 containing the shielding body 33. Instead, Sekiguchi's apparatus appears to subject the shielding body 33 to the same elevated pressure as that within the enclosure 9, resulting in vapors that enter the body 33 and must be evacuated with a discharging means 32.

As Sekiguchi does not disclose that the enclosure 9 is provided with an aperture through which the electron beam enters the enclosure 9, Sekiguchi also does not disclose or suggest the limitation in claim 42 requiring an aperture (62) formed by cutting the hood (52) with an electron beam to have a cross-section corresponding to the electron beam.

In view of the above, Applicants believe that Sekiguchi does not anticipate independent claim 1 or any of its dependent claims under the test for anticipation set forth at MPEP §2131, nor does Sekiguchi obviate independent claim 1 or any of its dependent claims under 35 USC §103. Therefore, Applicants respectfully request withdrawal of the rejection under 35 USC §102/103 based on Sekiguchi alone.

Rejections under 35 USC §103 based on Sekiguchi as Primary Reference

Independent claim 47 and dependent claims 42-44 and 48-50 were

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rejected under 35 USC §103 as being unpatentable over Sekiguchi in view of Japanese JP08185820A to Suzuki or in view of Suzuki and U.S. Patent No. 3,854,984 to Schadler. Applicants respectfully request reconsideration of these rejections in view of the following comments.

In the event that Sekiguchi was not considered to recite a hood (e.g., enclosure 9), Suzuki was cited for disclosing a separate enclosure 7 that contains material being evaporated by an electron beam E and an aperture 7b through which the beam E enters the enclosure 7. However, Suzuki does not teach, and Suzuki's Figures do not suggest, that the aperture 7b is sized to maintain an elevated pressure within the enclosure 7 relative to the remainder of the coating chamber, including that region of the chamber through which the electron beam E travels from the electron beam gun 5 to the enclosure 7. Therefore, any modification of Sekiguchi based on Suzuki would still follow Sekiguchi's teachings in which an electron beam gun is protected from vapors by a shielding body 33 subjected to the same pressure as the enclosure 9 (or Suzuki's enclosure 7), necessitating the evacuation of vapors from the shielding body 33 with the discharging means 32. Sekiguchi and Suzuki also do not disclose the limitation in claims 42 and 47 requiring an aperture (62) formed by cutting the hood (52) with an electron beam to have a cross-section corresponding to the electron beam.

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Schadler was merely cited for acknowledging that EBPVD apparatuses operate by melting a coating material with an electron beam. Therefore, Schadler does not cure the above-identified deficiencies in the combined teachings of Sekiguchi and Suzuki.

In view of the above, Applicants believe that the applied combinations of Sekiguchi, Suzuki, and Schadler do not obviate claims 42-44 and 47-50, and therefore respectfully request withdrawal of the rejections under 35 USC §103 based on these references.

Rejections under 35 USC §103 based on Murphy as Primary Reference

Independent claims 1 and 47 and their dependent claims 40-46 and 48-52 were rejected under 35 USC §103 as being unpatentable over U.S. Patent No. 5,716,720 to Murphy in view of Sekiguchi and Suzuki or in view of Sekiguchi and Suzuki in further view of U.S. Patent No. 4,238,525 to Aichert. Applicants respectfully request reconsideration of these rejections in view of the following comments.

Murphy was cited as disclosing an EBPVD apparatus with a coating chamber containing a "hood" (heat reflective enclosure) E. The enclosure E encloses a material "I" impinged by an electron beam that enters the enclosure through an opening. As with Sekiguchi and Suzuki, Murphy does not disclose

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that the opening is sized to maintain an elevated pressure within the enclosure E relative to the remainder of the coating chamber, including that portion of the chamber containing the electron beam gun. Therefore, any combination of Murphy, Sekiguchi, and Suzuki would follow Sekiguchi's teachings in which an electron beam gun is protected from vapors by a shielding body 33 subjected to the same pressure as the enclosure 9 (or Suzuki's enclosure 7, or Murphy's enclosure E), necessitating the evacuation of vapors from the shielding body 33 with the discharging means 32. Murphy, Sekiguchi, and Suzuki also do not disclose the limitation in claims 42 and 47 requiring an aperture (62) formed by cutting the hood (52) with an electron beam to have a cross-section corresponding to the electron beam.

Aichert was merely cited for noting that electron beam guns can be oriented perpendicular, which if Sekiguchi were modified according to Aichert would result in Sekiguchi's shielding body 33 having a wall parallel to a wall of Sekiguchi's enclosure 9. Therefore, Aichert does not cure the above-identified deficiencies in the combined teachings of Murphy, Sekiguchi, and Suzuki.

In view of the above, Applicants believe that the applied combinations of Murphy, Sekiguchi, Suzuki, and Aichert do not obviate claims 1 and 40-52, and therefore respectfully request withdrawal of the rejections under 35 USC §103 based on these references.

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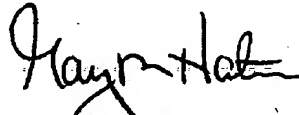
Closing

In view of the above, Applicants believe that all rejections to their claims have been overcome, and that the claims define patentable novelty over all the references, alone or in combination, of record. It is therefore respectfully requested that this patent application be given favorable reconsideration.

Should the Examiner have any questions with respect to any matter now of record, Applicants' representative may be reached at (219) 462-4999.

Respectfully submitted,

By


Gary M. Hartman
Reg. No. 33,898

February 28, 2005
Hartman & Hartman, P.C.
Valparaiso, Indiana 46383
TEL.: (219) 462-4999
FAX: (219) 464-1166